

Please replace the previous BACKGROUND OF THE INVENTION with the amended one provided below.

BACKGROUND OF THE INVENTION

Field of the Invention

This invention is directed to an analysis of a waveform for a telecommunication system or for a measurement equipment, and more particularly to a Digital Signal Processing of Multi-Sampled Phase (DSP MSP).

The DSP MSP allows waveform analysis, noise filtering, and data recovery for wireless, optical, or wireline transmission systems and measurement systems and for a wide range of data rates and waveform timings.

The invention further includes Sequential Data Recovery from Multi Sampled Phase (SDR MSP), which is a version of the DSP MSP, which provides clock and data recovery for optical communications.

Background Art

Conventional waveform analyzers and serial data receivers use an analog front end for signal filtering, data recovery, and for a generation of data recovery sampling clock.

Therefore more expensive bipolar or BICMOS technologies are needed to achieve sufficient performance, and such conventional designs have rather limited noise filtering capabilities and are able to cover only narrow application areas.

Analog design problems are further compounded by lower supply voltages which cause insufficient voltage head-room in deep sub-micron IC's which are becoming dominant in today's and future electronics.

There was a need for a waveform timing analyzer and a digital method of signal analysis which will reduce cost and complexity by replacing said analog or BICMOS technologies with less expensive CMOS technologies, and will improve noise filtering and increase

programmability of data analysis algorithms and improve reliability of data recovery functions.

The other relevant background art is presented by the citations listed below:

- D1. US 5,668,830 by Georgiu Christos, 16 September 1997,
- D2. PCT/CA01/00723 / W0 01 91297 by Bogdan John, 29 November 2001,
- D3. US 2002/0009171 by Ribo Jerome, 24 January 2002,
- D4. US 5,592,125 by Williams Bertrand, 07 January 1997,
- D5. US 6,987,817 by Reuveni David, 17 January 2006,
- D6. US 4,977,582 by Zelle Bruce, 11 December 1990,
- D7. US 5,467,464 by Opreescu Florin, 14 November 1995,
- D8. US 5,872,791 by Propp David, 16 February 1999,
- D9. EP 0 292 208 by American Telephone & Telegraph, 23 November 1988.

Explanations of such citations, communicated by the inventor during earlier prosecution stages, have been summarized in the "Summary of Background Art" attached to the Replay to the 2nd Office Action.

This invention is based on a substantially different principle of operation, relying on measurements of pulse lengths of incoming wave-form with accuracy matching single gate delays and digital processing of such accurate pulse lengths, in order to recover data transmitted by the wave-form or to analyze the waveform.

Such superior principle of operation combined with adaptive signal processing algorithms utilizing verification of received waveforms, eliminate significant limitations of the background art and thus enable significantly longer transmission distances.